

IN THE CLAIMS

For the Examiner's convenience, all of the now-pending claims are set forth below, whether amended herein or not. All of the remaining claims that have been added previously in this application, whether amended herein or not, are shown below as being completely underlined, because they were not included in the original patent upon which this reissue application is based.

Please amend Claims 6, 9, 11, 12, 16, 23, 28, 33, 36-41, 43, 49-56, 59, and 61 as shown below.

1. (Not Changed From Prior Version) A method of preparing an electron-emitting device, comprising the steps of:

forming electrodes opposed to each other on a substrate;

forming between the electrodes and in contact therewith

an insulating layer in which fine particles are completely
enclosed; and

etching the insulating layer so as to partially expose the fine particles.

2. (Not Changed From Prior Version) A method of preparing an electron-emitting device comprising the steps of:

forming electrodes opposed to each other on a substrate;

forming between the electrodes and in contact therewith a

semiconductor layer in which fine particles are completely enclosed;
and
etching the semiconductor layer so as to partially expose the fine particles.

3. (Not Changed From Prior Version) A method of preparing an electron-emitting device, comprising the steps of:

- (i) forming a semiconductor layer on a substrate;
- (ii) forming electrodes on said semiconductor layer; and
- (iii) dispersing fine particles between said electrodes.

4. (Not Changed From Prior Version) The method of claim 3, wherein said semiconductor layer comprises a layer comprising an amorphous silicon semiconductor, a crystallized silicon semiconductor, or a compound semiconductor.

5. (Not Changed From Prior Version) The method of claim 3, wherein said semiconductor layer has a film thickness of from 50 angstroms to 10 μ m.

6. (Twice Amended) A method of fabricating an electron-emitting device which comprises a pair of electrodes and a layer disposed between the electrodes, the method comprising the steps of:

disposing the pair of electrodes in first and second regions on a substrate,

respectively; and

providing the layer between the regions, the layer comprising a metal and a semiconductor, and being in contact with the electrodes so that current flows from one of the electrodes to another one of the electrodes through the layer by a voltage applied between the electrodes.

wherein the metal is Pd.

8. (Not Changed From Prior Version) The method of Claim 6, wherein the semiconductor is selected from the group consisting of carbon and SnO₂.

9. (Twice Amended) A method of fabricating an electron-emitting device, comprising the steps of:

disposing a pair of electrodes in first and second regions on a substrate,
respectively; and

providing a layer between the regions, the layer comprising carbon and a metal,
and being in contact with the electrodes so that current flows from one of the electrodes to
another one of the electrodes through the layer by a voltage applied between the electrodes.

wherein the metal is Pd.

11. (Twice Amended) A method of fabricating an electron-emitting device, comprising the steps of:

disposing a pair of electrodes in first and second regions on a substrate,

respectively; and

providing a layer between the regions, the layer comprising carbon and a metal,
and being in contact with the electrodes so that current flows from one of the electrodes to
another one of the electrodes through the layer by a voltage applied between the electrodes,
wherein the layer comprises primarily carbon.

12. (Twice Amended) A method of fabricating an electron-emitting device,
comprising the steps of:

disposing a pair of electrodes in first and second regions on a substrate,
respectively; and
providing a layer between the regions, the layer being in contact with the
electrodes so that current flows from one of the electrodes to another one of the electrodes
through the layer by a voltage applied between the electrodes, the layer comprising an insulating
material and at least some conductive particles which protrude from a surface of the layer,
wherein the conductive particles comprise Pd.

15. (Not Changed From Prior Version) The method of Claim 12, wherein
the insulating material is SiO₂.

16. (Twice Amended) A method of fabricating an electron-emitting device,
comprising the steps of:

disposing a pair of electrodes in first and second regions on a substrate,

respectively; and

providing a layer between the regions, the layer comprising carbon and at least some conductive particles, and being in contact with the electrodes so that current flows from one of the electrodes to another one of the electrodes through the layer by a voltage applied between the electrodes,

wherein the layer comprises primarily carbon.

18. (Not Changed From Prior Version) The method of Claim 16, wherein the conductive particles comprise a material selected from the group consisting of a metal and a semiconductor.

19. (Not Changed From Prior Version) The method of Claim 18, wherein the metal is Pd.

20. (Not Changed From Prior Version) The method of any one of Claims 16, 18, and 19, wherein at least some of the conductive particles protrude from a surface of the layer.

21. (Not Changed From Prior Version) The method of any one of Claims 12, 16, 18 and 19, wherein the conductive particles are spatially separated from one another.

22. (Not Changed From Prior Version) The method of any one of Claims

12, 16, 18 and 19, wherein diameters of the conductive particles are in a range of several tens of angstroms to several micrometers.

23. (Amended) A method of fabricating an electron-emitting device,
comprising the steps of:

forming an insulating layer on a first portion of a surface of a substrate, so as to
define a step-like structure;

disposing a first electrode on a second portion of the surface of the substrate;

disposing a second electrode on an upper surface of the insulating layer; and

providing a layer along a side of the insulating layer, between the first and
second electrodes, the layer comprising a metal and a semiconductor and being in contact with
the first and second electrodes so that current flows from the first electrode to the second
electrode through the layer by a voltage applied between the first and second electrodes.

26. (Not Changed From Prior Version) The method of Claim 23, wherein
the metal is Pd.

27. (Not Changed From Prior Version) The method of Claim 26, wherein
the semiconductor is carbon.

28. (Twice Amended) A method of fabricating an electron-emitting device,
comprising the steps of:

forming an insulating layer on a first portion of a surface of a substrate, so as to define a step-like structure;
disposing a first electrode on a second portion of the surface of the substrate;
disposing a second electrode on an upper surface of the insulating layer; and
providing a layer along a side of the insulating layer, between the first and second electrodes, the layer comprising an insulating material and a conductive material, and being in contact with the first and second electrodes so that current flows from the first electrode to the second electrode through the layer by a voltage applied between the first and second electrodes.

31. (Not Changed From Prior Version) The method of Claim 28, wherein the conductive material is selected from the group consisting of Pd and SnO₂.

32. (Not Changed From Prior Version) The method of Claim 31, wherein the insulating material is SiO₂.

33. (Amended) A method of fabricating an electron-emitting device, comprising the steps of:
forming an insulating layer on a first portion of a surface of a substrate, so as to define a step-like structure;

disposing a first electrode on a second portion of the surface of the substrate;
disposing a second electrode on an upper surface of the insulating layer; and

providing a layer along a side of the insulating layer, between and in contact with the first and second electrodes so that current flows from the first electrode to the second electrode through the layer by a voltage applied between the first and second electrodes, the layer including carbon and at least some conductive particles.

34. (Not Changed From Prior Version) The method of Claim 33, wherein the layer comprises primarily carbon.

35. (Not Changed From Prior Version) The method of Claim 33 or 34, wherein the conductive particles include Pd.

36. (Twice Amended) A method of fabricating an electron source that includes a plurality of electron-emitting devices, each electron-emitting device comprising a pair of electrodes and a layer disposed between the electrodes, wherein each electron-emitting device is prepared by a method comprising the steps of:

disposing the pair of electrodes in first and second regions on a substrate, respectively; and

providing the layer between the regions, the layer comprising Pd and a semiconductor, and being in contact with the electrodes so that current flows from one of the electrodes to another one of the electrodes through the layer by a voltage applied between the electrodes.

37. (Twice Amended) A method of fabricating an electron source that includes a plurality of electron-emitting devices, each electron-emitting device being prepared by a method comprising the steps of:

disposing a pair of electrodes in first and second regions on a substrate,
respectively; and

providing a layer between the regions, the layer comprising carbon and Pd, and
being in contact with the electrodes so that current flows from one of the electrodes to another
one of the electrodes through the layer by a voltage applied between the electrodes.

38. (Twice Amended) A method of fabricating an electron source that includes a plurality of electron-emitting devices, each electron-emitting device being prepared by a method comprising the steps of:

disposing a pair of electrodes in first and second regions on a substrate,
respectively; and

providing a layer between the regions, the layer including an insulating
material and at least some conductive particles, wherein at least some of the conductive particles
protrude from a surface of the layer, and the layer is in contact with the electrodes so that current
flows from one of the electrodes to another one of the electrodes through the layer by a voltage
applied between the electrodes,

wherein the conductive particles comprise Pd.

39. (Amended) A method of fabricating an electron source that includes a plurality of electron-emitting devices, each electron-emitting device being prepared by a method comprising the steps of:

forming an insulating layer on a first portion of a surface of a substrate, so as to define a step-like structure;

disposing a first electrode on a second portion of the surface of the substrate;

disposing a second electrode on an upper surface of the insulating layer; and

providing a layer along a side of the insulating layer, between and in contact with the first and second electrodes so that current flows from the first electrode to the second electrode through the layer by a voltage applied between the first and second electrodes, the layer comprising a metal and a semiconductor.

40. (Amended) A method of fabricating an electron source that includes a plurality of electron-emitting devices, each electron-emitting device being prepared by a method comprising the steps of:

forming an insulating layer on a first portion of a surface of a substrate, so as to define a step-like structure;

disposing a first electrode on a second portion of the surface of the substrate;

disposing a second electrode on an upper surface of the insulating layer; and

providing a layer along a side of the insulating layer, between and in contact with the first and second electrodes so that current flows from the first electrode to the second electrode through the layer by a voltage applied between the first and second electrodes, the layer

comprising an insulating material and a conductive material.

41. (Amended) A method of fabricating an electron source that includes a plurality of electron-emitting devices, each electron-emitting device being prepared by a method comprising the steps of:

forming an insulating layer on a first portion of a surface of a substrate, so as to define a step-like structure;

disposing a first electrode on a second portion of the surface of the substrate;

disposing a second electrode on an upper surface of the insulating layer; and

providing a layer along a side of the insulating layer, between and in contact with the first and second electrodes so that current flows from the first electrode to the second electrode through the layer by a voltage applied between the first and second electrodes, the layer including carbon and at least some conductive particles.

42. (Not Changed From Prior Version) A method of fabricating an image forming apparatus which includes an electron source and a phosphor plate, the electron source including a plurality of electron-emitting devices that are each prepared by a method according to any one of Claims 36-41.

43. (Twice Amended) A method of fabricating an electron-emitting device which comprises a pair of electrodes and a layer disposed between the electrodes, the method comprising the steps of:

disposing a pair of electrodes in first and second regions on a substrate,
respectively; and
providing the layer between the regions, the layer being a semiconductor layer
that includes a metal, and being in contact with the electrodes so that current flows from one of
the electrodes to another one of the electrodes through the layer by a voltage applied between the
electrodes,
wherein the metal is Pd.

45. (Not Changed From Prior Version) The method of Claim 43, wherein
the semiconductor layer includes a semiconductor selected from the group consisting of carbon
and SnO₂.

49. (Amended) A method of fabricating an electron-emitting device,
comprising the steps of:
forming an insulating layer on a first portion of a surface of a substrate, so as to
define a step-like structure;
disposing a first electrode on a second portion of the surface of the substrate;
disposing a second electrode on an upper surface of the insulating layer; and
providing a layer along a side of the insulating layer, between and in contact
with the first and second electrodes so that current flows from the first electrode to the second
electrode through the layer by a voltage applied between the first and second electrodes, the layer
being a semiconductor layer which includes a metal.

50. (Amended) A method of fabricating an electron-emitting device, comprising the steps of:

forming an insulating layer on a first portion of a surface of a substrate, so as to define a step-like structure;

disposing a first electrode on a second portion of the surface of the substrate;

disposing a second electrode on an upper surface of the insulating layer; and

providing a layer along a side of the insulating layer, between and in contact with the first and second electrodes so that current flows from the first electrode to the second electrode through the layer by a voltage applied between the first and second electrodes, the layer being an insulating layer which includes a conductive material.

51. (Twice Amended) A method of fabricating an electron source that includes a plurality of electron-emitting devices, each electron-emitting device being prepared by a method comprising the steps of:

disposing a pair of electrodes in first and second regions on a substrate, respectively; and

providing a layer between the regions, the layer comprising carbon and at least Pd particles, and being in contact with the electrodes so that current flows from one of the electrodes to another one of the electrodes through the layer by a voltage applied between the electrodes.

52. (Twice Amended) A method of fabricating an electron source that

includes a plurality of electron-emitting devices, each electron-emitting device comprising a pair of electrodes and a layer disposed between the electrodes, each electron-emitting device being prepared by a method comprising the steps of:

disposing a pair of electrodes in first and second regions on a substrate,
respectively; and

providing the layer between the regions, the layer being a semiconductor layer which includes Pd, and being in contact with the electrodes so that current flows from one of the electrodes to another one of the electrodes through the layer by a voltage applied between the electrodes.

53. (Twice Amended) A method of fabricating an electron source that includes a plurality of electron-emitting devices, each electron-emitting device being prepared by a method comprising the steps of:

disposing a pair of electrodes in first and second regions on a substrate,
respectively; and

providing a layer between the regions, the layer being a carbon layer which includes Pd, and being in contact with the electrodes so that current flows from one of the electrodes to another one of the electrodes through the layer by a voltage applied between the electrodes.

54. (Twice Amended) A method of fabricating an electron source that includes a plurality of electron-emitting devices, each electron-emitting device being prepared by

a method comprising the steps of:

disposing a pair of electrodes in first and second regions on a substrate,

respectively; and

providing a layer between the regions, the layer being an insulating layer which includes at least some conductive particles, wherein at least some of the conductive particles protrude from a surface of the layer, and the layer is in contact with the electrodes so that current flows from one of the electrodes to another one of the electrodes through the layer by a voltage applied between the electrodes,

wherein the conductive particles comprise Pd.

55. (Amended) A method of fabricating an electron source that includes a plurality of electron-emitting devices, each electron-emitting device being prepared by a method comprising the steps of:

forming an insulating layer on a first portion of a surface of a substrate, so as to define a step-like structure;

disposing a first electrode on a second portion of the surface of the substrate;

disposing a second electrode on an upper surface of the insulating layer; and

providing a layer along a side of the insulating layer, between and in contact with the first and second electrodes so that current flows from the first electrode to the second electrode through the layer by a voltage applied between the first and second electrodes, the layer being a semiconductor layer which includes a metal.

56. (Amended) A method of fabricating an electron source that includes a plurality of electron-emitting devices, each electron-emitting device being prepared by a method comprising the steps of:

forming an insulating layer on a first portion of a surface of a substrate, so as to define a step-like structure;

disposing a first electrode on a second portion of the surface of the substrate;

disposing a second electrode on an upper surface of the insulating layer; and

providing a layer along a side of the insulating layer, between and in contact with the first and second electrodes so that current flows from the first electrode to the second electrode through the layer by a voltage applied between the first and second electrodes, the layer being an insulating layer which includes a conductive material.

57. (Not Changed From Prior Version) A method of fabricating an image forming apparatus which includes an electron source and a phosphor plate, the electron source including a plurality of electron-emitting devices that are each prepared by a method according to any one of Claims 51-56.

59. (Amended) A method of fabricating an electron-emitting device, comprising the steps of:

disposing a pair of electrodes in first and second regions on a substrate, respectively; and

providing a layer between the regions, the layer comprising carbon and a metal

particle, and being in contact with the electrodes so that current flows from one of the electrodes to another one of the electrodes through the layer by a voltage applied between the electrodes,
wherein a diameter of the metal particle is in a range of several tens of angstroms to several micrometers.

60. (Not Changed From Prior Version) The method of Claim 59, wherein the metal particle comprises Pd.

61. (Amended) A method of fabricating an electron-emitting device, comprising the steps of:

disposing a pair of electrodes in first and second regions on a substrate,
respectively; and

providing a layer between the regions, the layer comprising carbon and at least some conductive particles, and being in contact with the electrodes so that current flows from one of the electrodes to another one of the electrodes through the layer by a voltage applied between the electrodes,

wherein diameters of the conductive particles are in a range of several tens of angstroms to several micrometers.

62. (Not Changed From Prior Version) The method of Claim 61, wherein the conductive particles comprise Pd.